Disability in Uganda: A medical intervention to measure gendered impacts on functional independence and labour-market outcomes

Abstract

Using data from a medical intervention in Uganda, this paper estimates the health and economic impacts of providing orthotic equipment to adults with lower limb disabilities. We examine changes to: (i) functional mobility and (ii) labour market outcomes, including type of employment and monthly earnings. One year after the intervention, the effects are noticeably gendered; males exhibit an improvement in their level of functional mobility, while females face little change or a reduction in their levels. In terms of labour market outcomes, for males the intervention leads to an increase in monthly earnings, which is partly due to a switch from self- to wage employment. Effects on female labour market outcomes generate more nuanced results. Earnings increase for women, although the overall effect is much smaller. Taking into account the intensity of equipment use, our Wald estimates reveal larger marginal effects on both mobility and earnings.

Keywords: Intervention, orthotic equipment, people with disabilities, gender.
JEL Classification: J22, D13, I15, I20.

1. Introduction

This paper uses data from a medical intervention to investigate the impact of providing medical equipment on the health and economic status of adults with physical disabilities. Specifically, we provide orthotic equipment (such as callipers, crutches and shoe raises) to Ugandan adults with a lower limb disability, and using responses to detailed surveys and medical assessments, measure levels and changes in mobility, employment and earnings.

This question is examined in the context of the introduction of the Sustainable Development Goals, which has put disability on the development agenda. The slogan for 'no one to be left behind' signals a sea change in development policy that introduces the possibility of improving life outcomes for people living with disabilities. The numbers affected by disability are not negligible; the World Health Survey estimates that approximately 15.6 percent of the global population suffer from a disability (WHO and World Bank, 2011). This equates to 785 million adults of which 60 to 80 million (approximately 10 percent) live in Africa (Disabled World, 2013).

Although the incidence of disability varies across the African continent, countries with a legacy of weak healthcare and conflict have a greater proportion of their populations living with disabilities. Many go untreated. Uganda stands out in this respect; the Ugandan Bureau of Statistics (2006) reports that one in six of the population is disabled, of those 48 percent suffer from a physical disability, with polio and road traffic accidents being the leading causes. Facilities to treat are scarce with the majority of care being provided by either the National Referral Hospital in Kampala (at a cost) or scattered NGOs who have limited funding (May-Teerink, 1999). There is scant evidence documenting the life circumstances of this group of society, nor has there been any interventions to show whether and to what extent the provision of appropriate medical treatment would improve their condition and overall level of well-being. Focusing on just one aspect of disability, namely a lower limb physical disability, we address this gap in the literature.

In the analysis that follows, our approach is two-fold. First, we examine whether and the extent to which the medical intervention leads to any changes in mobility levels measured by objective medical tests administered by a team of UK doctors. Second, we investigate whether the intervention leads to an improvement in labour market outcomes, including the type of employment and monthly earnings, measured using a detailed socio-economic survey conducted by trained Ugandan enumerators overseen by UK economists.

Overall the effects of the intervention are remarkably gendered; men exhibit an improvement in their level of mobility, while women face little change or a reduction in their functional performance. Investigating these effects further, we find for males, it is those without polio (who became disabled later in life) that see the biggest improvement in mobility levels, particularly those who had their existing orthotic equipment readjusted or replaced or who were fitted with orthotic equipment for the first time. In contrast, the beneficial effects are much weaker for those with polio (who had typically been disabled since childhood). For females, regardless of the length of the disability, it is those who received orthotic equipment for the first time that experience a small improvement in levels of mobility.

These findings may reflect differences in the ease with which participants were able to adapt to their new equipment, with women and men with polio finding the adjustment more difficult (at least initially), highlighting the need for follow-up care in interventions of this kind. In developed countries, fitting would be followed up with physiotherapy to aid patients in making the necessary adjustments to their gait. Due to limited resources after care was only provided a year after the intervention.

In terms of labour market outcomes, prior to the intervention we were uncertain that it would lead to any noticeable improvement to earnings. As is the case in many developing countries, discrimination towards people with disabilities is deeply engrained in society with documented evidence that it hinders their employment opportunities (Tripney, *et al.*, 2015; Sightsavers, 2016).[1]; and for women there is 'double discrimination' (once because of their gender and once because of their disability).[2] The expectation was that any increased earnings would be from the ability of participants to exert more physical effort or be able to do tasks that were previously not possible, rather than through a change in attitudes by employers. Despite this, we find some evidence that the intervention did affect labour market outcomes, resulting in higher earnings for a sub-sample of participants. For men, this arises, at least in part, due to a switch from self- to wage employment, while a significant proportion also change job (but not sector of employment). For women, although monthly earnings increase, the overall effect is once again much smaller, perhaps reflecting their poorer outcomes in terms of mobility and the additional barriers they often face.

Finally, as alluded to, after-care was only provided one year after the intervention. As a result, poorly fitted or broken equipment could not be adjusted or mended in the interim. Although this does not hinder the validity of the study, it may dampen and weaken any outcomes. Accordingly, as part of the sensitivity analysis we explore how sensitive the findings are to how frequently the equipment was used. The results of this exercise reinforce previous findings, and shows that once intensity of use is accounted for, estimated coefficients are significantly larger in magnitude.

The findings reveal that the provision of orthotic equipment to people with disabilities in low-income countries can improve mobility levels and have important economic benefits. However, this research also shows that even within a narrow category of people with disabilities there is still significant variation in conditions which impacts on outcomes. While identifying who benefits most can help when targeting limited budgets, nevertheless, there is also a need for further research to explore why certain individuals, particularly females, benefit less than others. One hypothesis is that since the new equipment requires significant physical adaptation to use effectively, muscle strength is important. Without follow-up physiotherapy perhaps the women were unable to overcome years of weak power to adapt effectively, or perhaps more time is needed to identify positive outcomes.

[1] See systematic reviews by Tripney, *et al.* (2015) and subsequently Sightsavers (2016) on the effects of interventions on the labour market outcomes of adults with disabilities in low- and middle-income countries.
[2] Previous analysis found that 46 percent of the sample had experienced discrimination in the past (Owens and Torrance, 2016).

The remainder of the paper is organized as follows. Section 2 describes the background and existing literature. Section 3 outlines the intervention design including the sampling approach and implementation of the intervention. Section 4 presents the data and descriptive statistics. Section 5 outlines the specification and key results, while in Section 6 we conclude.

2. Background

To date, studies on people with disabilities have focused on providing information on their status at a point in time and space – typically using cross-sectional household surveys. Studies have shown that living with disability undermines economic and social wellbeing. People with disabilities face higher costs of healthcare, are more likely to be poor on multiple indicators of deprivation and are more likely to be socially and politically marginalised (Groce *et al.*, 2011; Mitra *et al.*, 2013; Sightsavers, 2016). They are also likely to have lower levels of subjective well-being which is exacerbated by their lower material wealth (Fafchamps and Kebede, 2008; Barazzetta, *et al.,* 2019). School-age children with disabilities are less likely to be enrolled in school (Filmer, 2008); adults with disabilities have restricted access to employment and income-earning opportunities (Yeo and Moore, 2003); households with members with disability are likely to be poorer than households without (Harris-White, 1996; Masset and White, 2004; and in Uganda Hoogeveen, 2005). In addition, poverty and marginalization are compounded when gender and disability intersect, leading to double discrimination. WHO (2015) reports women are less likely to be able to access healthcare, education and employment than men with disabilities or non-disabled women, both of which groups already experience grossly unfair levels of discrimination.

Exclusion from daily or social activities implies that people with disabilities will also face exclusion from existing poverty alleviation programmes. Evidence from the Swedish Development Agency (SIDA) suggests that staff have limited understanding and knowledge on how to include the interests of people with disabilities in aid projects and dialogue, which often results in people with disabilities not being considered a high priority in poverty reduction strategies (Ribohn, 2013). The World Bank (2007) reports that between 2002 and 2006 only four percent of all Bank projects, representing five percent of lending volume, had an integrated disability component. Kett *et al*. (2009) note that in Nigeria, policymakers and the public at large view disability issues in terms of charity and welfare, which mitigates against the social inclusion of people with disabilities within policy agendas. If this is the case, then people with disabilities are unable to benefit from poverty interventions and are more likely to remain in perpetual poverty. Parents with disabilities can lead to an inter-generational transmission of poverty. Anecdotal evidence from Africa suggests that in most cases, prolonged

poverty and disability are closely related (Lwanga-Ntale and McClean, 2004). This is a concern when we consider the numbers affected.

Figures for Uganda show that 16 percent of the population report having a disability, 48 percent of which have a physical disability (Ugandan Bureau of Statistics, 2006).[3] A review of the database of the largest disability charity in Uganda – the Uganda National Action on Physical Disability (UNAPD), show that over 70 percent of members report a lower limb disability impairing their ability to stand or walk which could be treated with prosthetics and orthotic equipment. Assistive technologies are often simple to implement, and they facilitate functions allowing individuals greater integration in society. In developed countries, this is a discipline with an established record. However, this is often neglected by medical authorities and donors in developing countries where it receives little public health input. Furthermore, in developing countries, there are few prosthetics and orthotics (P&O) facilities; production and quality of equipment are often poor, and national governments do not see P&O services as a priority leading to a lack of strategic policies (WHO, 1999).

Although the Ugandan government is among the world leaders in terms of political empowerment of people with disabilities (Yeo and Moore, 2003; Owens and Torrance, 2016), with more than 47,000 disabled elected representatives at various national and community levels of government, there are few government programmes for the disabled (May-Teerink, 1999). Uganda has a long history of the uneven provision of P&O services; in 2013, there were only five public clinics, with most support provided by NGOs that have lacked necessary funding thus limiting their coverage.

Improving access to appropriate treatment for people with disabilities is a key challenge in many developing countries. In Uganda, while there is an assessment of P&O needs (Altman, 1998) and a description of the disabled population (Lwange-Ntale and McClean, 2004), there is no study which provides specific evidence on the impact a medical treatment would have on the lives of the disabled. The existing evidence on the impact of orthotic equipment is fragmented, uses cross-sectional data (see Borg *et al*., 2012 for Bangladesh), is limited to developed countries and rarely makes use of robust statistical techniques. The limited evidence that does exist suggests that providing orthotic equipment improves quality of life (Moraros and Hodge, 1993[4]; Walter and Stoitz, 2004[5]). Similarly,

[3] This is not surprising considering the prevalence of diseases that cause disability (e.g. polio), the war in Northern Uganda that lead to the loss of limbs, and finally, the stigma associated with disability that may steer households to hide mentally disabled members.

[4] A survey of 512 adults fitted with foot orthoses in the US over a period of 14 weeks finds patient satisfaction to be excellent; in 62.5 percent of cases the main complaint is completely resolved, and the devices reduce or delay the need for surgery.

[5] A survey of 275 patients treated in Philadelphia, Pennsylvania, was conducted regarding their satisfaction with thermoplastic prescription foot orthoses. One year after, the majority of respondents indicate that they are satisfied with

Mauro *et al*. (2015) study in Karnataka (India), finds both a short and long term (4 and 7 years, respectively) impact on subjective measures of well-being from a community based rehabilitation programme. However, the initial positive effect on livelihoods declined over time. Systematic reviews by Tripney, *et al.* (2015) and subsequently Sightsavers (2016) on the effects of interventions on the labour market outcomes of adults with disabilities in low- and middle-income countries (LMICs) find that low labour force participation comes from negative attitudes and stigmatisation of disabilities. There is an ongoing stereotyping that people with disabilities are not suitable for participating in the labour market. Hence the positive effects of labour market interventions are often negated by such social attitudes and perceptions. However, their overall finding concerns the scarcity of information indicated by only 8 studies that met their selection criteria.

Addressing these notable gaps raised in the literature, we look in detail at the effect the provision of orthotic equipment has on functional mobility and labour market outcomes for people with lower limb disabilities in Uganda. Given the heterogeneity of the sample, even within this narrow category of disability, we differentiate between specific interventions and levels of disability to identify the interventions that worked best and for whom. Our theoretical motivation is based on the seminal work of Becker (1964) who asserts that health, like education, can be considered a form of human capital. Building on this, Grossman (1972) argues that although individuals inherit a stock of health, which subsequently depreciates with age, they have the capacity to invest in health inputs, thereby increasing their health stock.[6] Changes in health stock can therefore affect labour market outcomes through two distinct pathways (Strauss and Thomas, 1998; Thirumurthy *et al*., 2008). First, it can influence productivity or wages directly. Second, independent of its effect on wages, health can alter the marginal rate of substitution between consumption and leisure; poor health may, for example, make it more difficult for someone who is ill to perform wage than non-wage activities, reducing labour supply. We turn now to discuss in detail the medical intervention, before outlining the empirical strategy and regressions that we use to estimate the health and labour market response to the medical intervention.

their devices, obtaining a 60 percent to 100 percent significant relief of symptoms. Very few patients indicate total dissatisfaction; only 9 percent report 0 percent relief of symptoms.

[6] The health production function describes how health inputs interact to produce a level of health, and how health status changes if the health inputs used and their combinations change.

3. Medical Intervention

3.1 Overview

The project was initiated in the spring of 2011 with the aim of taking unwanted and used orthotic equipment from the UK to treat people with a lower-limb disability in Uganda.[7] The orthotic equipment, defined as externally applied mechanical devices that support or supplement weakened or abnormal joints or limbs, included callipers, foot and ankle orthosis, crutches and orthotic shoes.[8] This equipment was collected from hospitals and orthotic manufacturers in the UK in 2011 before being shipped to Kampala (Uganda) in February 2012, where it arrived in June 2012.[9]

Potential candidates for inclusion in the intervention were decided in collaboration with the University of Makerere and the two main disability charities in Uganda.[10] In consultation with the UK orthotists, a relatively straightforward selection criteria was applied; all adults aged between 15 and 65 with a lower limb disability were eligible for inclusion in the study. We then used a snowball sampling strategy to draw up a list of names of potential participants from the Charity registers, health clinics and hospitals, and randomly invited 200 of these individuals for inclusion in the medical intervention.

The intervention itself took place at the Mulago National Referral Hospital, Kampala, the largest hospital in Uganda, and ran for 15 working days in June 2012. A team of UK-based economists, orthotists and medical doctors, with the help of local Ugandan staff, treated and surveyed the sample participants. During the intervention, word of mouth led to several people turning up at the hospital hoping to be treated. Since we had 'no shows', these individuals were also assessed by the orthotists and those that met the selection criteria were included in the study.[11] In June 2013, the entire UK team returned to the Mulago hospital to carry out the second wave of the intervention. All participants were invited back to have their equipment reassessed and re-adjusted where necessary, and then were re-surveyed.

[7] Ethical approval for the intervention was granted by both the University of Nottingham and the Uganda National Council for Science and Technology in June 2012 (reference: SS2781). All ethical protocols were adhered to and a team of enumerators from the University of Makerere with survey work experience administered the questionnaires to participants in their local language. The enumerators were themselves supervised by a Health Economist based at the University. Two of the eight enumerators had a lower limb disability.
[8] ISO 8549-1:1989.
[9] We also received assistance from the Nottingham Police Aid Convoys: http://www.npac.org.U.K
[10] The National Union of Disabled Persons of Uganda and the Uganda National Action on Physical Disability.
[11] These participants gathered at the gates of the hospital from 8.30am; triage was completed by 10am, and then those eligible to take part in the intervention were treated and surveyed.

The initial sample in June 2012 comprised of 245 adults with a lower-limb disability, who were treated.[12] In November 2012 and April 2013, we carried out a short telephone survey to maintain contact with the sample and reduce attrition. We nevertheless, experienced an attrition rate of 34 percent between the initial intervention and subsequent follow-up, which was largely due to a transport strike that occurred in Kampala during the follow-up visit.[13] A balance test on the 2012 data between those who did and did not attend the follow-up shows that no significant differences exist between the baseline characteristics of the two groups (see Table A1 in the Appendix). In other words, the attrition appears to be random. Even though our final sample is somewhat reduced, it nevertheless still comprises of 150 participants for which we have baseline and follow-up information.

In terms of the equipment used, each participant received a combination of the following six types of orthotic equipment:

i. Knee-Ankle-Foot Orthosis (KAFO): This is a long-leg orthosis that spans from the knee to the ankle of the participant to stabilise the joints and assist the leg muscles.
ii. Ankle-Foot Orthosis (AFO): This controls the position and motion of the ankle, compensates weakness, or corrects deformities such as foot drop.
iii. Knee-Ankle Brace: This extends above and below the knee joint to support and align the knee.
iv. Crutch and Leg Stick: This aids mobility by transferring the body weight from the legs to the upper body.
v. Shoe Raise: This is a footwear that raises the foot of the wearer and compensates for leg length discrepancy.
vi. Other Equipment: This includes miscellaneous items such as shoes, insoles, wrist splints, heel caps.

Table 1 shows the total number of each type of equipment allocated to participants during the intervention, disaggregated by gender.

<<Table 1 here>>

In total, 269 pieces of equipment were given to participants as part of the intervention. This is greater than the sample size since participants often needed more than one piece of equipment (receiving two on average). The table also shows that no significant gender differences exist in terms of the type of

[12] 16 were treated but are not included in the study due to the severity of their disability and their inability to perform any of the medical tests.
[13] Mbale taxi drivers strike over fees by Vision Reporter (17th June 2013): Click here to access the report. We repeatedly phoned those who missed their appointments, which they said they would have attended provided they could get transportation.

equipment received. As part of the sensitivity analysis, we also consider how robust our findings are to the frequency with which a piece of equipment is used.

3.2 The Ugandan Disability Survey (UDS)

During the intervention, a team of enumerators administered a detailed questionnaire designed to collect information on each participant's demographic and socio-economic characteristics including details of their labour market characteristics.[14] Each participant was also asked to take part in a medical assessment carried out by the UK medics. Here, the medics collected a detailed medical history of each participant, which included questions relating to the nature of their impairment, the age of onset, current orthotic treatment, the frequency of falls, and the level of pain at rest and during activity. In addition, at both the baseline and during follow-up, the medics carried out two well established and easy to implement locomotive tests designed to assess functional mobility, the 10-metre walk test and the timed up and go (TUG) test. In what follows, we use the outcome of these two tests to assess the objective health effects of the intervention.

The *10-metre walk test* assesses gait speed in metres per second (m/s) and measures the time it takes a person to walk at a normal pace over a short distance without assistance. To allow for acceleration and deceleration the total distance walked is ten metres, although only walking speed for the intermediate six metres is measured (Wolf, *et al.* 1999). Gait speed is important for community mobility, for example, crossing a street before the traffic light changes. Normal gait speed varies by age and gender but on average, a healthy male in his 40s can walk 1.46 m/s and a healthy female 1.39 m/s (Bohannon, 1997).

The *TUG test* measures, in seconds, the time it takes an individual to rise up from a chair, walk three metres, turn, walk back to the chair, and sit down (Podsiadlo and Richardson, 1991). No physical assistance is allowed, except for the use of a mobility aid such as a crutch. This test is a standard and reliable measure of functional performance that captures transfers, gait and turning movements. The test results are easy to interpret, with a slower time indicating a poorer functional performance and an increased risk of falls. In the analysis that follows, the TUG test is analysed both as a continuous and as a categorical variable to indicate normal versus below normal mobility levels. Scores of around 10 seconds or less indicate normal mobility. Although reported cut-off times vary from 10 to 13.5 seconds in the literature (Lusardi, *et al*., 2017), depending on the study and sample participants, a recommended, practical cut-off, within the specialty, suggests a TUG score of less than 12 seconds to indicate normal versus below normal performance (Bischoff *et al.,* 2003).

[14] The individual-level survey was piloted in Kampala a week prior to the intervention when enumerators and their supervisors attended a training workshop.

4. Summary Statistics: Baseline Characteristics

4.1 Baseline: Demographic and Socioeconomic Characteristics

We start our preliminary analysis by presenting an overview of the baseline characteristics of the sample disaggregated by gender (Table 2). In the first three columns, we report mean responses and the respective standard deviations, while in the final column we report p-values to test the equality of the means between men and women.

<<Table 2 here>>

The sample was 43 percent female, with a mean age of 41 years and had just under 9 years of education (equivalent to a lower secondary education), 43 percent were married, while nearly two-thirds were the household head living in a household with, on average, four other members, one of which was a child under the age of 15.

The vast majority of respondents (75 percent) were in some form of employment, spending an average of 52 hours per week in work, with 63 percent of those in employment working more than a standard working week. Over three-quarters of those in employment were self-employed, while the rest were in some form of wage employment in the private sector. Employment was usually low-skilled, men were typically employed as street vendors, laundrymen or iron benders[15], while women were employed as secretaries, hairdressers or clothes vendors. Median earnings were also low, averaging around 100,000 UGX per month, which equates to $40 per month or $2 per day. The 26 percent of the sample that were in wage employment earned significantly more than those in self-employment. This holds for males and females. Comparing men and women across employment type, although numbers are small, and not statistically significant, women in wage employment earned more than men, and in self-employment less. These results were driven by the types of jobs. The few females in wage employment were engaged in relatively skilled jobs compared to their male counterparts. Even after taking into account the earnings of other household members the sample was still poor, with 61 percent living in households that the World Bank would classify as being in extreme poverty.

Although few significant differences exist between males and females in terms of their baseline employment and schooling characteristics, there were differences in marital status and household characteristics. Here, we find that 57 percent of men were married compared to only 25 percent of women, while females were also less likely to have children. In a developing country setting where

[15] Iron bending was a common activity amongst the sample. It involves bending reinforcement bars to required angles in civil and construction engineering; usually performed on a construction site. Manual bar bending involves strenuous upper body physical activity.

children are often viewed as an insurance mechanism to protect livelihoods in times of crisis and old age, this adds to the vulnerability these women face. This might reflect the fact that females are still seen as the primary caregivers within a household, and as such are responsible for many labour-intensive tasks that women with a disability may find difficult to complete, making them less likely to marry and have children.[16] The share of divorcees and widows was also higher among females. Although such marital shocks often make women more vulnerable to economic hardships and social stigma (Djuikom and van de Walle, 2018) only 3 percent of females lived alone, and we observe no significant difference in poverty levels between the two groups.

4.2 Ugandan National Panel Survey (UNPS)

Next, to place this description of our dataset in context, in Table 3 we compare the baseline characteristics of our sample with the Ugandan National Panel Survey (UNPS, 2012), a nationally representative sample of households in Uganda. In order to make meaningful comparisons, we restrict our focus to respondents in the UNPS who were of similar age and lived in the same area of Uganda as our sample, namely Kampala and surrounding districts. As before we report mean responses and the respective standard deviations, while in the final column we report the p-value to test the equality of the means between the two samples.

<<Table 3 here>>

Table 3 shows that significant differences exist between the two samples in terms of their demographic and household-level characteristics. Our sample was significantly less educated, reporting on average, 1.6 fewer years of education, while they were more likely to live alone than the average respondent in the UNPS. In a society where intergenerational living arrangements are common, this latter finding highlights some of the problems people with disability face integrating into society. In line with this, those with a disability lived in a household with fewer other members and had less children than their non-disabled counterparts.

Furthermore, we observe noticeable differences in the labour market outcomes between the two groups. Those with a disability were more likely to be (self-) employed and the sample's median monthly earnings were significantly lower compared to their non-disabled counterparts (100,000 UGX versus 209,000 UGX, equivalent to approximately $40 versus $84). Moreover, the former were four times more likely to be living in extreme poverty than the latter. This finding is not surprising in

[16] For example, when water is not piped to the home, the burden of fetching often falls disproportionately on women; while the traditional method of cooking on a three-stone cooking fire is a task that someone with a disability could struggle. In our sample, 79 percent of respondents had un-piped water sources and 91 percent cooked with firewood or charcoal.

light of the fact that those with a disability, at least in our sample, had fewer other household members in employment.

Taken together, these preliminary findings highlight that people with disabilities in Uganda, as in most developing countries, are worse off than their non-disabled counterparts whether this is measured in terms of education or job earnings. They also face extreme conditions of poverty and have limited access to appropriate healthcare. Gender-wise, women with disabilities face difficulties because of both their disability and their gender; similar to men they have limited socio-economic opportunities and lack access to healthcare, yet they are also less likely to marry and have fewer children.

4.3 Baseline: Medical History

Finally, we present the past medical history of the sample, disaggregated by gender (Table 4). As before, we report mean responses and the respective standard deviations in the first three columns. In the final column, we report p-values to test the equality of the means between males and females.

<<Table 4 here>>

The main source of disability for the sample was polio (62 percent), with other sources including road traffic accidents (11 percent) and cerebral diseases (9 percent). Other conditions (15 percent) such as osteoarthritis, birth defects and osteomyelitis were also reported, although none individually constituted more than 4 percent of the total dataset. The majority of those with polio became disabled during childhood (around 4 years of age), while for the other groups the onset of disability was much later (around 25 years).

In terms of the 10-metre walk test, the average gait speed was 0.58 m/s, which is very slow when compared to a healthy adult where gait speed averages 1.43 m/s (Bohannon, 1997). Similarly, the time taken to complete the TUG was just under 14 seconds, and as such, 43 percent of the sample were classified as having extremely poor mobility levels. In addition, nearly two-thirds of the sample reported a fear of falling, 35 percent had experienced at least one fall in the past month (with an average of two falls in the past month). Around two-thirds also reported pain, especially while moving. Despite this, visits to see a doctor/nurse were rare, only 48 percent reported that they had seen a health professional in the past year.

Considering the conditions by gender we see that there is almost an even occurrence of polio, bone related and cerebral conditions, however, men were more likely to have been involved in a road accident and women were marginally more likely to report a variety of ‘other’ conditions. In terms

of mobility, there is a significant difference in the 10-metre walk test between males and females (women only covered a distance of 0.55 m/s, compared to males who covered 0.66 m/s); they also performed the TUG test in a slower time than men (although this difference is only significant at the 15 percent level). Females also experienced more pain than males and were more likely to have visited a medical practitioner in the previous year.

In terms of mobility aids, only a small proportion of the sample was using any form of orthotic equipment (for example, KAFOs or callipers) with the majority relying on rudimentary aids (for example, poles/sticks or wooden crutches). A significant proportion, especially women, had no equipment, highlighting the need for interventions of this kind.

The descriptive statistics paint a picture of a sample with extreme mobility problems. While the inclusion criteria (of a lower limb disability) appears narrow, in reality there was significant variation between participants. In particular, many of those who had been disabled for longer (often due to polio) had developed their own style of moving: from those who walked with a simple wooden pole, curling their damaged leg around the pole; to those struggling with heavy wooden crutches; to those crawling. For many, years of using poorly fitted, heavy equipment, or having no equipment at all, has led to additional medical complaints, including for example, curvature of the spine, due to the way they had adapted their gait to account for their disability. With this in mind, we now turn to examine the effect the medical intervention has had on two key outcomes: functional mobility and participation in the labour market.

5. Results

5.1 Medical Intervention: Before-After Estimator

We examine the effect the intervention has on our key outcomes of interest using a simple before-after estimator where we compare the difference in mean outcomes. Formally, the before-after estimator can be written as:

$$Y_{i,t+1} - Y_{i,t} = \Delta Y_i = \alpha + X_i'\gamma + \Delta v_i \qquad (1)$$

where the subscripts t and $t+1$ represent the time before and after the intervention; Y_i is the outcome of interest for individual i; α is the constant term and our main variable of interest capturing the change in the outcome variable between baseline and follow-up; X_i is a vector of pre-treatment variables that are not affected by the intervention. In this case, given the small sample size, we choose to include only a gender dummy and a dummy variable that takes the value of one if the participant's disability arose due to polio. Finally, Δv_i $(= v_{it+1} - v_{it})$ is the random error term.

The before-after estimator suffers from two potential drawbacks, referred to in the literature as 'history' and 'maturation' (Shadish, *et al*., 2001). The former refers to the fact that events other than the intervention may have occurred during the period of interest, which might then contribute to the differences in outcomes we observe between baseline and follow-up. Although macroeconomic events might have non-ignorable effects on labour market outcomes, we argue that the time period that has elapsed is unlikely to have been long enough to see significant changes in the economy. The period 2012 to 2013 was one of macroeconomic stability; while the average rate of growth for the financial year of 2012 was 3.4 percent, this had returned to pre-slump levels of 5 percent by 2013. Figures from the International Labour Organization suggest that the labour force participation rate was virtually constant at a rounded 71 percent in both years.[17] To control for inflation results are reported in real terms.

The second potential drawback, maturation, refers to the concern that the differences we observe may be the result of ageing rather than the intervention itself, although since the follow-up is only one year later this is unlikely to be the case. Despite this, if anything, ageing and maturation should have a negative effect on most of our outcome measures and hence the coefficients we present in this study should, at the very least, be a lower bound of the true causal effect of the intervention. In terms of our functional mobility measures, we also have evidence that they are comparable from one year to the next (Mesquita, *et al*., 2016).[18] In consultation with the medics at the design of the project, the decision was made to identify a disability that would be comparable across individuals and over time. Given the length of time participants had been disabled, it is it is unlikely that their impairment would have worsened during the intervening year. Finally, when comparing the performance of men and women following treatment, the same argument applies. Since the follow-up was only one year later we argue that any difference in outcomes we observe is due to the intervention, rather than any other factors.

5.1.1 Empirical Results

Table 5 reports the before-after estimates of the effect the intervention had on our measures of functional mobility. Columns 1 and 2 examine changes in gait speed and the TUG test, respectively, while in column 3 we look at changes in mobility status (1 if normal mobility, 0 otherwise). Overall, the results show that there were noticeable differences between men and women in terms of the effect the intervention had on mobility levels.

[17] International Labour Organization, ILOSTAT database. Data retrieved in April 2019.
[18] Using the TUG and 6-minute walk tests, the authors examined the effect of a pulmonary rehabilitation programme on 500 COPD patients with cardiovascular comorbidities between 2012 and 2014.

<<Table 5 here>>

Panel A, column 1 shows that for males although the intervention has little effect on gait speed, measured by the 10-metre walk test, column 2 shows that they perform the TUG test 1.3 seconds faster than in the previous year, which leads to an increase in the proportion of men whose mobility levels are 'normal' (column 3). In contrast, for females, regardless of the measure used, the intervention has a negative effect on mobility levels; it reduces gait speed by 0.08 m/s, increases the time taken to complete the TUG test by 2.3 seconds, leading to a decrease in the number of women with normal mobility levels.

Investigating these effects further, in Panel B we include a dummy variable for whether the participant became disabled due to polio (1 if had polio, 0 otherwise) together with the corresponding gender interactions. The results show that for males, the main beneficiaries of the intervention are those without polio. For this group, the intervention increases gait speed by 0.08 m/s, reduces the time taken to complete the TUG test by 3.3 seconds and has a positive effect on mobility levels. In comparison, for those with polio, although the intervention improves gait speed, it has little effect on the TUG test, while a much smaller proportion experience an improvement in their overall level of mobility. Similar differences hold for females, although now it is the case that the intervention leads to a larger deterioration in gait speed and increase in the time taken to complete the TUG test for those with polio than without.

These findings may reflect differences in the ease with which participants were able to adapt to their new equipment, suggesting a need for follow-up physiotherapy care in future interventions of this kind. The extent of this need was not foreseen by the medics during the design of the intervention (nor would it have been possible given the budget). Indeed, for some, the equipment may have required significant physical adaptation to use effectively, making muscle strength important. If this is the case then the greater upper body strength of men may have made it easier for them to adapt to their new equipment, while the lack of follow-up care may have meant that the women were unable to overcome years of weak power to adapt effectively. In addition, those who had been disabled for longer (usually due to polio) had often developed their own particular gait, making adjustment to the new equipment more difficult, at least initially.

Further support for this can be found in Table A2 in the Appendix where we document changes in mobility disaggregated by the five main equipment changes.[19] For men with polio, we find that although those who were fitted with orthotic equipment for the first time experience a deterioration

[19] It should be noted that participants received the type of equipment that was most appropriate for their condition. For some this was rudimentary equipment such as aluminium crutches or shoes with raises.

in mobility, mobility levels are unchanged for those who had their existing orthotic equipment readjusted or replaced. In other words, although the speed of adjustment may be slow, it appears that those with polio will eventually adapt to wearing any new equipment. For males without polio, adjustment is much easier. Here the beneficial effects are greatest for those who had their existing orthotic equipment readjusted or replaced or who were fitted with orthotic equipment for the first time (compared with those who received basic equipment or rudimentary aids). For females, regardless of the nature their disability, it is those who receive orthotic equipment for the first time that experience a small improvement in mobility.

Next, we present the before-after estimates of the impact the intervention had on labour market outcomes (Table 6). In column 1, we examine changes in employment status (1 if employed, 0 otherwise) for the whole sample. In columns 2 to 5 we explore changes in labour market outcomes for those individuals who were employed in both waves, including changes to real earnings (column 2), wage or self-employment status (columns 3 and 4, respectively) and jobs (column 5). The results suggest that although the intervention has no significant effect on the level of employment, column 2 shows that for those already in employment it has a positive effect on earnings.[20]

<<Table 6 here>>

For men, this arises because the intervention leads to a switch in employment from self- to wage employment, while a significant proportion also change job (but not sector of employment). Indeed, further analysis shows that it is those men who enter wage employment (from self-) that experience the biggest increase in earnings, followed by those who switched to a new wage-employed job. These results are not reported here but are available upon request. As before, the results for women are more muted. Monthly earnings increase although the overall effect is smaller than for males, as indicated in column 2. Although it appears that the intervention leads to a switch from wage to self-employment, further investigation revealed that only four women influence this outcome, two of which now have a job in both sectors.

It should, however, be noted that a preference for self-employment among women was strong in both waves; in 2012, around 92 percent of females reported that they would like their own business, compared to 69 percent of men, while in 2013, reported figures were 83 percent versus 77 percent, respectively. As already mentioned, since women are still the primary caregivers within a household,

[20] In this specification, we do not include a dummy for whether the participant had polio because it was not statistically significant. However, results are robust to the inclusion of this variable.

they are often time poor. Self-employment therefore offers them a higher degree of flexibility, providing them with an opportunity to strike a balance between labour market and household tasks. Moreover, since those in self-employment usually work from home – over half of females reported that they resided where their business was located, while the remaining half had on average a five minute walk to work - it saves them from the difficulties associated with travelling to work, and offers other benefits that wage employment may not be able to provide, for instance, the flexibility to take time off when ill. As found in the literature, gendered motivations for self-employment differ considerably, while men are likely driven by higher potential returns, women often want flexibility aimed at a better work-life balance (Simoes *et al*. 2015).

Again, we find evidence that some of the differences in labour market outcomes that we observe can be explained by the changes in equipment that occurred because of the intervention. In line with our previous findings, Table A3 in the Appendix provides tentative evidence that it is those males who had their orthotic equipment readjusted or replaced, or who switched from using rudimentary aids (e.g. a stick/pole) to orthotic equipment that see the biggest increase in earnings. In contrast, for females, it is those who switched to having rudimentary aids for the first time that see the largest rise increase in earnings.

5.2 Sensitivity Analysis

A limitation of our approach is that it assumes that all participants make full use of the equipment provided to them. As already mentioned, since we were unable to provide regular check-ups to adjust and maintain the equipment, issues with fitting are likely to have occurred. As part of the follow-up interviews, participants were asked to document the extent to which this was the case, including any problems that they faced (see Table A4 in the Appendix for a detailed overview). Reassuringly, usage was high; 57 percent of participants used their equipment every day, with just over two-thirds using the equipment at least once a week. The most frequent reason for not using the equipment was that it had broken (35 percent), although other reasons included poor fitting (18 percent), sores/pain due to the equipment (18 percent), lost or stolen equipment (8 percent) or that usual activities took longer with the equipment (6 percent). Although few significant differences exist between males and females in terms of their reasons for not using the equipment, a notable exception was that 35 percent of women reported that their equipment was poorly fitted, compared to 4 percent of men, once again highlighting the need for follow-up care, especially among women respondents.

To illustrate, Table 7 shows the evolution of two participants (#177 and #77) during the intervention. It shows that participant #177 used the equipment a few times per month, while #77 was unable to use the equipment because it had broken. Before being treated, participant #177 performed the TUG

and 10-metres walk tests in over 21 seconds and 0.5 m/s, respectively and reported monthly earnings of 70,000 UGX while in self-employment.

<<Table 7 here>>

One year after the intervention, having used the equipment more often, this individual showed important improvements in the outcomes of interest; specifically, performing the TUG and 10-metres walk tests much faster, in only 8 seconds and 0.8 m/s respectively, while monthly earnings increased to 350,000 UGX. On the other hand, although participant #77 performed the initial TUG and 10-metre walk tests in a much quicker time of 9 seconds and 0.6 m/s respectively, one year later, and not having used the equipment, this individual' key outcomes remained virtually unchanged.

This illustration is insightful and shows that the extent to which participants used their equipment needs to be accounted for in the analysis. In the language of the treatment effects literature, given that some individuals did not or could not comply with using the equipment, what we have estimated in the previous sub-section is an intention to treat (ITT) effect rather than the average treatment effect on the treated (ATT).

In the spirit of Bloom (1984), to account for this potential issue and estimate the effect of the intervention on those who used the equipment (ATT), we use the Wald estimator. To do this, we define a dummy indicator D_i that takes a value of one for participants who used the equipment at least once a week; then, the average treatment effect on the treated, denoted α_{ATT}, can be estimated using the Wald estimator as follows:

$$\alpha_{ATT} = \frac{E(Y_{i,t+1} - Y_{i,t})}{\Pr(D_i = 1)} \quad (2)$$

As equation (2) shows, the main idea behind the Wald estimator is to rescale the intervention effects estimated above (the ITTs) by the fraction of participants who used the equipment on a regular basis.

5.2.2 Empirical Results: Average Treatment Effect on the Treated (ATT)

Table 8 reports that overall, 68 percent of participants used their equipment at least once a week, and intensity of use was similar for both men and women.

<<Table 8 here>>

The Wald estimates for the health and labour market outcomes are in Tables 9 and 10, respectively. Both sets of results reinforce our previous findings. They show that the estimated coefficients are larger in magnitude once we account for the frequency with which the equipment was used. Perhaps of particular note is that males without polio now demonstrate a significant improvement in the 10-

metre walk and TUG scores, recording an improvement of 0.12 m/s and 5 seconds, respectively. In contrast, for females, especially those without polio the magnitude of the effects are slightly better in terms of the mobility tests. This implies that for those that adapted well to their new equipment, consistent use of the orthotic equipment essentially pays off.

<<Table 9 here>>

Additionally, labour market outcomes in Table 10 show that for men monthly earnings increase by 2,074 UGX when we rescale the intervention effects by intensity of use. We observe a 16 percent increase in the likelihood of male participants switching to wage-employed jobs, while 18 percent are also more likely to change jobs following the intervention. Similarly, females benefit from the intervention in terms of the effect it has on their earnings, increasing them by 1,037 UGX.

<<Table 10 here>>

6. Conclusion

This paper uses data from a unique medical intervention to estimate the health and economic impacts of providing orthotic equipment to adults with lower limb disabilities. We examine changes to: (i) functional mobility and (ii) labour market outcomes, including type of employment and monthly earnings.

Overall, our findings provide evidence of improved functional mobility following the intervention, although the beneficial effects are noticeably stronger for males than females. One year after treatment, men exhibited an improvement in their level of mobility, while women faced little change or in some cases a reduction in their functional performance. Investigating these effects further reveals that regardless of gender, the intervention worked better for some groups of participants than others. For men it was those without polio that saw the biggest improvement in their mobility levels, particularly those who either received orthosis for the first time or had their existing orthotic equipment adjusted or replaced, compared to those who arrived using very rudimentary equipment. In contrast, the beneficial effects are much weaker for those with polio (who had typically been disabled since childhood). For women, regardless of the length of the disability, it is those who received orthotic equipment for the first time that experience a small improvement in mobility.

In terms of labour market outcomes, the intervention leads to an increase in monthly earnings. For men, this arises, at least in part, due to a switch in employment from self- to wage employment, although a significant proportion also change job (but not sector of employment). For women, the results are less pronounced. Monthly earnings increase although the overall effect is much smaller

than for males, perhaps reflecting their poorer outcomes in terms of mobility, but also the additional barriers to accessing appropriate employment they are still likely to face.

Taken together, this study shows that even with a small sample, our empirical findings provide compelling evidence that this type of medical intervention can have positive effects on the life outcomes of adults with lower limb disabilities. These results echo previous studies in the literature reporting the connection between health and labour market outcomes (Grossman, 1972; Strauss and Thomas, 1998; Thirumurthy et al., 2008).

Despite this, we show that even within a narrow category of people with disabilities, women benefited less from the intervention than men. The women in the sample faced difficulties because of both their disability and their gender; similar to men they have limited socio-economic opportunities and lack access to healthcare, yet they are also less likely to be married and have fewer children. However, one finding relevant for future interventions concerns the speed with which they adapted to using the equipment. Women were more likely to experience higher levels of pain than men and were more likely to complain of poor fitting. It follows from this that more targeted help to females is clearly needed to ensure they benefit from interventions of this type. An appropriate intervention could aid such women in accessing appropriate healthcare as well as sustainable, disability- and family-friendly employment opportunities in order to bridge both gender and disability related inequalities.

Although the WHO reports that the number of people with disabilities will increase over the next decade, interventions of this type have not yet been widely implemented in many developing countries (WHO, 2015). Although this intervention provides policy makers with a number of key findings, it also identifies a number of lessons to take forward. A limitation of the intervention, and these studies in general, is the lack of follow-up care. Opportunities were missed to improve outcomes due to a lack of medical knowledge among local professionals. Indeed, one of the main problems people with disability face is widespread barriers in accessing appropriate health care services, including medical care, therapy and assistive technologies. In the first wave, we provided training through local orthotists shadowing the UK team. This was not sufficient to encourage after care. To account for this in the second wave, in addition to shadowing, we provided daily training to the local orthotists. In future interventions of this kind, we would recommend such training from the outset and prolonged after the outside teams leave.

Finally, the effectiveness of interventions of this kind also need to be assessed in terms of their long term impact. Our study used equipment transported from the UK which due to the terrain may have had a shorter shelf life than when used in the UK. Being able to repair the equipment locally should

have been explored. While we do not think this affects the short term impact, it may have an effect on long term outcomes. We suspect a trial using local equipment may find similar short term impacts but perhaps better long term effects.

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Table 1: Items Allocated

	(1)	(2)	(3)	(4)
	All	**Males**	**Females**	**p-value**
Knee-Ankle-Foot Orthosis (percent)	0.22	0.21	0.23	0.716
Knee-Ankle-Foot Orthosis (#)	(33)	(18)	(15)	
Ankle-Foot Orthosis (percent)	0.23	0.21	0.25	0.559
Ankle-Foot Orthosis (#)	(34)	(18)	(16)	
Knee-Ankle Brace (percent)	0.19	0.21	0.16	0.413
Knee-Ankle Brace (#)	(28)	(18)	(10)	
Crutches (percent)	0.44	0.45	0.42	0.702
Crutches (#)	(66)	(39)	(27)	
Shoe Raise (percent)	0.27	0.26	0.28	0.730
Shoe Raise (#)	(40)	(22)	(18)	
Other Orthotic Equipment (percent)	0.45	0.42	0.50	0.325
Other Orthotic Equipment (#)	(68)	(36)	(32)	
Observations	150	86	64	
Items allocated	269	151	118	

Notes: The table shows the number of items allocated during the intervention. It should be noted that the total number of items is greater than the sample size because some participants were allocated with more than one piece of equipment. Number of observations are in parenthesis.

Table 2: Summary Statistics – Demographic and Socio-Economic Characteristics

	(1)	(2)	(3)	(4)
Variables	**All**	**Males**	**Females**	**p-value**
Demographic Characteristics:				
Age (years)	40.56	42.09	38.50	0.088
	(12.78)	(13.43)	(11.62)	
Schooling (years)	8.89	8.94	8.83	0.871
	(3.81)	(3.65)	(4.03)	
Marital Status:				
Single (=1)	0.21	0.16	0.28	0.081
	(0.41)	(0.37)	(0.45)	
Married (=1)	0.43	0.57	0.25	0.000
	(0.50)	(0.50)	(0.44)	
Divorced (=1)	0.15	0.09	0.22	0.031
	(0.35)	(0.29)	(0.42)	
Widowed (=1)	0.13	0.07	0.20	0.015
	(0.33)	(0.26)	(0.41)	
Cohabiting (=1)	0.08	0.10	0.05	0.200
	(0.27)	(0.31)	(0.21)	
Household Characteristics:				
Lives alone (=1)	0.09	0.13	0.03	0.038
	(0.28)	(0.34)	(0.18)	
Household head (=1)	0.65	0.71	0.56	0.064
	(0.48)	(0.46)	(0.50)	
Household size	4.85	4.85	4.84	0.989
	(2.28)	(2.34)	(2.21)	
At least one dependent child (=1)	0.53	0.57	0.48	0.303
	(0.50)	(0.50)	(0.50)	
No. of dependent children	1.33	1.56	1.03	0.043
	(1.58)	(1.72)	(1.33)	
No. of other adults in household in employment	0.85	0.72	1.02	0.110
	(1.12)	(0.93)	(1.32)	
Labour Market Outcomes:				
Employed (=1)	0.75	0.80	0.67	0.070
	(0.44)	(0.40)	(0.47)	
Hours worked (per week)	51.71	49.07	55.95	0.104
	(21.79)	(20.62)	(23.16)	
Worked more than 40 hours per week (=1)	0.63	0.59	0.70	0.273
	(0.48)	(0.49)	(0.46)	
Monthly median earnings (in 000s of UGX)	100	150	100	0.501
	(841)	(1037)	(340)	
Extreme poverty (=1)	0.61	0.64	0.56	0.343
	(0.49)	(0.48)	(0.50)	
Wage employment:				
Wage employment (=1)	0.26	0.23	0.30	0.412
	(0.44)	(0.43)	(0.46)	
Monthly median wages (in 000s of UGX)	211	199	300	0.198
	(335)	(298)	(384)	
Self-employment:				
Self-employment (=1)	0.76	0.78	0.72	0.462
	(0.43)	(0.42)	(0.45)	
Monthly median profits (in 000s of UGX)	60	80	40	0.013
	(810)	(1018)	(190)	
Observations	150	86	64	

Notes: UGX= Ugandan Shillings. Statistics for earnings and employment type are for the sample of employed workers only. The proportion in wage and self-employment adds up to more than one because two participants had both a wage and self-employed job. Pearson's chi-squared test is used to test the null hypothesis that median values differ between males and females. Monthly median earnings = median wages + median profits from self-employment. Extreme poverty is measured using the World Bank's definition, which classifies a household as living in extreme poverty if it lives on less than $1.90 per day. Standard deviation is in parenthesis.

Table 3: Summary Statistics - UDS versus UNPS

	(1)	(2)	(3)
Variables	**UDS**	**UNPS**	**p-value**
Demographic Characteristics:			
Female (=1)	0.43	0.52	0.049
	(0.50)	(0.50)	
Age (years)	40.56	29.83	0.000
	(12.78)	(13.55)	
Schooling (years)	8.89	10.45	0.001
	(3.81)	(5.17)	
Single (=1)	0.21	0.49	0.000
	(0.41)	(0.50)	
Married (=1)	0.43	0.40	0.464
	(0.50)	(0.49)	
Divorced (=1)	0.15	0.06	0.000
	(0.35)	(0.24)	
Widowed (=1)	0.13	0.04	0.000
	(0.33)	(0.19)	
Household Characteristics:			
Lives alone (=1)	0.09	0.02	0.000
	(0.28)	(0.14)	
Household head (=1)	0.65	0.30	0.000
	(0.48)	(0.46)	
Household size	4.85	6.57	0.000
	(2.28)	(3.70)	
At least one dependent child (=1)	0.53	0.66	0.004
	(0.50)	(0.48)	
No. of dependent children	1.33	1.78	0.005
	(1.58)	(1.79)	
No. of other adults in household in employment	0.85	2.55	0.000
	(1.12)	(1.85)	
Labour Market Outcomes:			
Employed (=1)	0.75	0.52	0.000
	(0.44)	(0.50)	
Hours worked (per week)	51.71	43.74	0.007
	(21.79)	(28.37)	
Worked more than 40 hours per week (=1)	0.63	0.58	0.325
	(0.48)	(0.49)	
Monthly median earnings (in 000s of UGX)	100	209	0.005
	(841)	(437)	
Extreme Poverty (=1)	0.61	0.15	0.000
	(0.49)	(0.36)	
Wage employment:			
Wage employment (=1)	0.26	0.56	0.000
	(0.44)	(0.50)	
Monthly median wages (in 000s of UGX)	211	209	0.733
	(335)	(436)	

Self-employment:			
Self-employment (=1)	0.76	0.52	0.000
	(0.43)	(0.50)	
Monthly median profits (in 000s of UGX)	60	200	0.008
	(810)	(358)	
Observations	150	691	
Notes: See notes for Table 2.			

Table 4: Summary Statistics – Medical History

	(1)	(2)	(3)	(4)
Variables	**All**	**Males**	**Females**	**p-value**
Polio (=1)	0.62	0.60	0.64	0.656
	(0.49)	(0.49)	(0.48)	
Road traffic accident (=1)	0.11	0.16	0.05	0.027
	(0.32)	(0.37)	(0.21)	
Bone related (=1)	0.03	0.02	0.03	0.766
	(0.16)	(0.15)	(0.18)	
Cerebral (e.g. stroke) (=1)	0.09	0.09	0.08	0.750
	(0.28)	(0.29)	(0.27)	
Other conditions (e.g. hip infection) (=1)	0.15	0.12	0.20	0.146
	(0.36)	(0.32)	(0.41)	
Age at onset of disability (years) – Polio	3.78	3.15	4.59	0.151
	(4.76)	(2.20)	(6.70)	
Age at onset of disability (years) – Non-polio	24.67	25.22	23.86	0.782
	(17.44)	(15.99)	(19.71)	
Health at baseline:				
10-metre walk test (m/s)	0.58	0.61	0.55	0.070
	(0.21)	(0.20)	(0.23)	
TUG test (seconds)	13.89	12.73	15.31	0.147
	(10.49)	(5.50)	(14.40)	
Mobility: Normal (=1 if TUG<=12)	0.57	0.55	0.60	0.539
	(0.50)	(0.50)	(0.49)	
Fear of falling (=1)	0.69	0.71	0.67	0.626
	(0.46)	(0.46)	(0.47)	
No. of falls in the past month	1.74	1.88	1.55	0.568
	(3.51)	(3.70)	(3.26)	
Had at least one fall in the past month (=1)	0.35	0.36	0.33	0.683
	(0.478)	(0.483)	(0.473)	
Pain (=1)	0.70	0.65	0.77	0.132
	(0.46)	(0.48)	(0.43)	
Pain at rest (0-10)	1.54	1.48	1.61	0.750
	(2.44)	(2.38)	(2.54)	
Pain during activity (0-10)	4.23	3.80	4.80	0.072
	(3.25)	(3.38)	(3.01)	
Seen a doctor/nurse in the last year (=1)	0.48	0.41	0.57	0.064
	(0.50)	(0.49)	(0.50)	
Current equipment: KAFO/calliper (=1)	0.18	0.21	0.14	0.282
	(0.39)	(0.41)	(0.35)	
Current equipment: Crutches (=1)	0.26	0.27	0.25	0.811
	(0.44)	(0.45)	(0.44)	
Current equipment: Stick/pole (=1)	0.21	0.26	0.14	0.086
	(0.41)	(0.44)	(0.35)	
Current equipment: Other (e.g. shoes) (=1)	0.03	0.01	0.05	0.187
	(0.16)	(0.11)	(0.21)	
Current equipment: None (=1)	0.33	0.26	0.42	0.032
	(0.47)	(0.44)	(0.50)	
Observations	150	86	64	150

Notes: For the 10-metre walk and TUG tests, the summary statistics are based on the sample of 145 and 141 individuals who were able to perform the respective tests in 2012. Standard deviation is in parenthesis

Table 5: Before-After Estimates – Change in Health Outcomes

	(1)	(2)	(3)
	10-metre walk	**TUG**	**Mobility: Normal**
Panel A			
Treatment effect	0.000	-1.290**	0.173***
	(0.024)	(0.583)	(0.061)
Female (=1)	-0.075**	3.549***	-0.260***
	(0.032)	(1.134)	(0.080)
Panel B			
Treatment effect	0.082*	-3.286***	0.367***
	(0.042)	(0.965)	(0.101)
Female (=1)	-0.167***	4.877***	-0.567***
	(0.055)	(1.594)	(0.136)
Polio (=1)	-0.133***	3.326***	-0.322**
	(0.049)	(1.172)	(0.124)
Female * Polio	0.149**	-2.306	0.496***
	(0.066)	(2.183)	(0.165)
Observations	138	133	133

Notes: Results are for the sample of participants with valid health measures in both waves. Robust standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 6: Before-After Estimates – Change in Labour Market Outcomes

	(1)	(2)	(3)	(4)	(5)
	Employment	**Monthly earnings (in 000s)**	**Wage employment**	**Self-employment**	**Job change**
Treatment Effect	-0.035	1.359**	0.103*	-0.086	0.121***
	(0.051)	(0.574)	(0.059)	(0.062)	(0.043)
Females (=1)	0.066	-1.170*	-0.155**	0.189**	0.008
	(0.071)	(0.632)	(0.069)	(0.079)	(0.069)
Observations	150	97	97	97	97

Notes: Results in columns 2 to 5 are for the sample of participants who were employed in both waves. Robust standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 7: Evolution of Two Participants

ID	Outcomes	2012	2013	Change
#177	TUG (s)	21	8	↓
	10-metres walk (m/s)	0.5	0.8	↑
	Earnings (UGX)	70000	350000	↑
	Used equipment	✓		
#77	TUG (s)	9	9	-
	10-metres walk (m/s)	0.6	0.7	↑
	Earnings (UGX)	40000	40000	-
	Used equipment	✗		

Table 8: Equipment Usage

	(1) All	(2) Males	(3) Females
Pr(Di =1)	0.680***	0.686***	0.672***
	(0.038)	(0.050)	(0.059)
Observations	150	86	64

Notes: The table shows the proportion of treated participants who used the equipment given during the intervention at least once a week. Robust standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 9: Wald Estimates – Change in Health Outcomes

	(1) 10-metre walk	(2) TUG	(3) Mobility: Normal
Panel A			
Treatment effect	0.001	-1.861**	0.250***
	(0.034)	(0.850)	(0.092)
Female (=1)	-0.075**	3.543***	-0.259***
	(0.031)	(1.126)	(0.082)
Panel B			
Treatment effect	0.118*	-4.694***	0.524***
	(0.062)	(1.496)	(0.156)
Female (=1)	-0.165***	4.642***	-0.540***
	(0.056)	(1.659)	(0.151)
Polio (=1)	-0.132***	3.274**	-0.316**
	(0.050)	(1.263)	(0.138)
Female * Polio	0.147**	-1.970	0.458**
	(0.067)	(2.221)	(0.183)
Observations	138	133	133

Notes: See notes for Table 5

Table 10: Wald Estimates – Change in Labour Market Outcomes

	(1)	(2)	(3)	(4)	(5)
	Employment	**Monthly earnings (in 000s)**	**Wage employment**	**Self-employment**	**Job change**
Treatment Effect	-0.051	2.074**	0.158*	-0.132	0.184***
	(0.075)	(0.889)	(0.090)	(0.094)	(0.066)
Females (=1)	0.065	-1.087*	-0.148**	0.184**	0.015
	(0.071)	(0.639)	(0.068)	(0.077)	(0.071)
Observations	150	97	97	97	97
Notes: See notes for Table 6					